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Addition of dialkylphosphorous acids and of their acid chlorides to α-epoxides

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Abstract

1. It has been shown that dimethylphosphorous and diethylphosphorous acids add to, ethylene oxide, 1,2epoxycyclohexane; and 1,2-epoxy 3-ethoxypropane in presence of small amounts of boron tr fluoride etherate with formation of the corresponding esters of 2 hydroxyalkylphosphonic acids. When sulfuric acid or sodium diethyl phosphite is used as catalyst, the addition products are formed in low yield. 2. Diethyl and -ethylene phosphorochloridites add readily to ethylene oxide, to 2,3-epoxybutane, and to 1,2epoxycyclohexane. In the reaction between diethyl phosphorochloridite and ethylene oxide or 2,3-epoxybutane, the main product -2-chloroethyl diethyl phosphite (or 2-chloro-i-methylpropyl diethyl phosphite) -was accompanied by by-products -triethyl phosphite and bis(2-chloroethyl) ethyl phosphite (or tris(2-chloro-l-methylpropyl)ethyl phosphite) -formed by a process of disproportionation during the reaction. In the addition reactions between diethyl phosphorochloridite and 1,2-epoxycyclohexane and between ethylene phosphorochloridite and ethylene oxide, a single addition product was obtained in each cases 2-chlorocyclohexyl diethyl phosphite (66% yield) and 2-chloroethyl ethylene phosphite (95% yield). © 1953 Consultants Bureau.

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